

## 5.1 Sequences

Ex 1

$$a_n = \frac{1}{2n}$$

$n=1$   
explicit formula

the  $n=3$  term of  
the sequence

$$\{a_n\} \text{ or } \{a_n\}_{n=1}^{\infty} = \left\{ \frac{1}{2(1)}, \frac{1}{2(2)}, \frac{1}{2(3)}, \dots \right\}$$

the general term  
of the sequence

$\uparrow$   $\uparrow$   $\uparrow$   
 $n=1$   $n=2$   $n=3$

$$= \left\{ \frac{1}{2}, \frac{1}{4}, \frac{1}{6}, \dots \right\}$$

Find an explicit formula for  $a_n$

Ex 2

$$2, \frac{2}{3}, \frac{2}{9}, -\frac{2}{27}, \dots$$

Common ratio:  $r = -\frac{1}{3}$

proves this is  
a geometric sequence

$$\begin{aligned} \frac{a_2}{a_1} &= \frac{-2/3}{2} & \frac{a_3}{a_2} &= \frac{2/9}{-2/3} \\ &= -\frac{1}{3} & &= -\frac{1}{3} \end{aligned}$$

$$\boxed{a_n = a \cdot r^{n-1}}$$

How to Obtain Explicit Formulae

$$a_1 = 2$$

$$a_2 = a_1 \left( \frac{a_2}{a_1} \right) = a_1 \cdot r$$

$$a_3 = a_2 \left( \frac{a_3}{a_2} \right) = a_2 \cdot r = (a_1 \cdot r) \cdot r$$

$$a_n = 2r^{n-1}$$